The Role of Lipids and Macromolecules in Kidney Stone Formation

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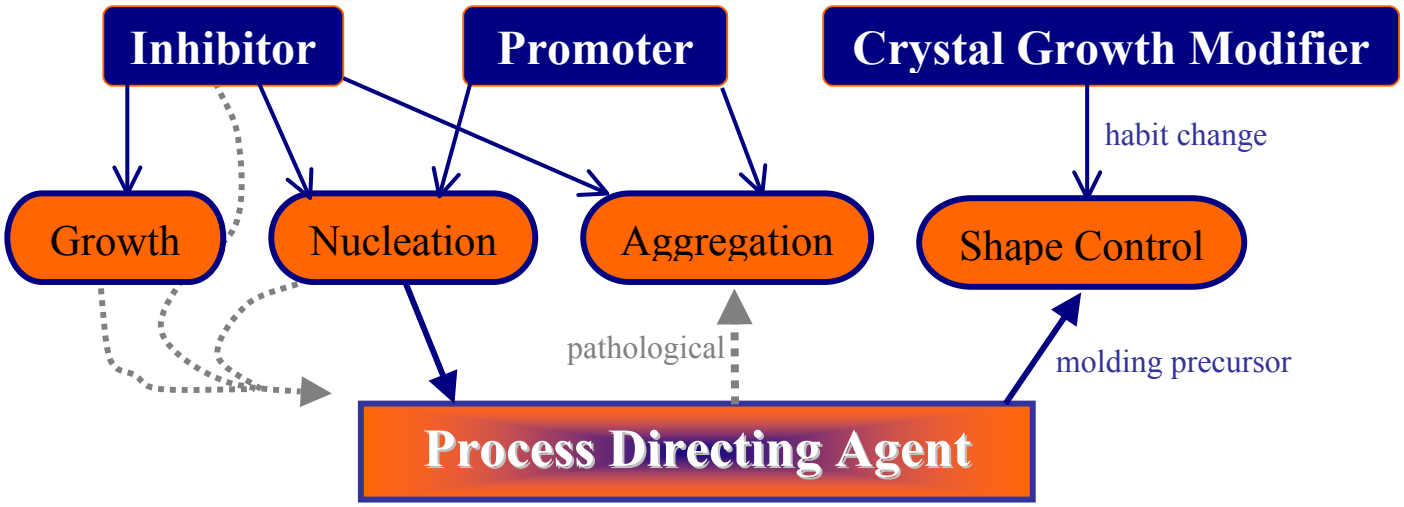
Novelty of BRP Approach

- Polymer-induced liquid-precursor (PILP) mineralization process
  - influence of acidic proteins on crystal nucleation, growth, and aggregation
- Crystal interactions with biopolymers
  - Mimetic membranes (Langmuir films)- crystal nucleation; activity/specificity
  - Mimetic proteins- specific vs. non-specific (PILP) affect on crystal nucleation/growth/aggregation
- Engineering and quantifiable techniques
  - Statistically designed experiments
    - quantitative determination of significant factors; indication of interaction effects between multiple factors in complex media
  - AFM for measuring interaction forces
    - particle-particle interactions in various media (e.g. artificial urine, polymer and lipid coatings, cultured cells)
  - Optical Tweezers technique for measuring interaction forces
    - manipulate particles to contact coated surfaces (e.g. mimetic membranes with crystals, or phospholipid vesicles with mineral film).

Biomineralization

Role of Acidic Biopolymers



Role of Lipid Membranes